

REMARKS

Review and consideration of the application in view of Applicants' amendments and remarks are respectfully requested. Claims 1 and 10-13 are amended, and are supported in the specification at least at page 7, lines 13-16, the structures on pages 8 and 9, and the claims as originally filed.

Applicants thank Examiner Shosho for the telephone conferences of June 2nd, June 10th, and June 21st regarding the above-identified application and the applied references. The substance of the telephone interviews is reflected in the above amendments and following remarks.

Applicants respectfully request entry of the Declaration under 37 C.F.R. §1.132 of Dr. Huijuan Chen, filed April 16, 2004, and relied upon herein. Examiner Shosho indicated in the telephone conference of June 21, 2004, that the Declaration would be entered on the record.

Claims 1, 10, 12, 14, and 17-18 have been rejected under 35 USC §103(a) as being unpatentable over Sacripante et al. (US 6,025,412) in view of Figuly (US 5,136,014).

Claim 13 has been rejected under 35 USC §103(a) as being unpatentable over Sacripante et al. in view of Figuly as applied to Claims 1, 10, 12, 14 and 17-18 above, and further in view of *Polymer Science Dictionary*.

Claim 15 has been rejected under 35 USC §103(a) as being unpatentable over Sacripante et al. in view of Figuly as applied to Claims 1, 10, 12, 14 and 17-18 above, and further in view of Evans et al. (US 6,468,338).

Claim 16 has been rejected under 35 USC §103(a) as being unpatentable over Sacripante et al. in view of Figuly as applied to Claims 1, 10, 12, 14 and 17-18 above, and further in view of either Chen et al. (US 6,431,700) or Evans et al. (US 6,001,161).

Applicants respectfully traverse each and every one of the above rejections for at least the following reasons.

The Office Action relies on the primary combination of Sacripante et al. in view of Figuly in all of the stated rejections. This combination of

references will be addressed first, and individual tertiary references addressed afterwards.

The claimed invention is directed to an ink jet ink comprising a water-soluble hyperbranched polymer, wherein the polymer has a dye chromophore and a hydrophilic group incorporated into the polymer base chain. The hydrophilic groups incorporated into the base chain are shown in the specification in the exemplary polymer structures on pages 8 and 9, and indicated by the possible polymer compositions recited throughout the specification. In particular, it is indicated that the polymer can be a polyamide, polyester, polyether, vinylic polymer, polyimine, polyesteramide or polyurethane at page 7, lines 13-16. The base chain of all of these polymers includes hydrophilic groups, for example, quaternary amines, carboxyl groups, or carbonyl groups. The presence of these groups in the base chain makes the hyperbranched polymer inherently water-soluble. In water, the hyperbranched polymer maintains a macromolecular form rather than aggregating. This is demonstrated in the Declaration of Dr. Huijuan Chen, a co-inventor, wherein it is shown by size exclusion chromatography that no particles are formed by the hyperbranched polymer in water because the size of the hyperbranched polymer macromolecules was not measurable with a Microtrac Ultra Fine Particle Analyzer (*see* page 3 of Declaration).

According to the Office Action, Sacripante et al. discloses an ink jet ink comprising water, a humectant, and a polyester having a dye attached within the base chain or to the base chain as a side chain component. As admitted in the Office Action, Sacripante et al. does not disclose or suggest a hyperbranched polymeric dye. Figuly is cited for disclosure of a hyperbranched polyester. Neither Sacripante et al. nor Figuly disclose or suggest the subject matter of the claimed invention.

Sacripante et al. is directed to an ink jet ink including particles of a dye-polymer resin dispersed in a liquid vehicle. Sacripante et al. specifically teaches away from a lack of particles by stating the dye-polymer resin forms particles having a number average particle size of from about 2 nm to about 500 nm at col. 4, line 67, - col. 5, line 8, after teaching that a sufficient number of hydrophilic groups could be attached to the polymer base chain to render the polymer soluble in water (col. 4, lines 52-60). Sacripante et al. renders the

particles water-soluble by attaching hydrophilic groups to the polymer base chain. One of ordinary skill in the art would not look to Sacripante et al. to form the claimed invention because Sacripante et al. is directed to formation of particles of a dye-polymer resin.

Figuly is directed to hyperbranched functional polyesters that can be used as rheology modifiers. Combining Figuly with Sacripante et al. must result in the formation of particles of dye-polymer resin, wherein the resin is a hyperbranched polymer, because of the teaching of particles in Sacripante et al.. As known in the art of ink jet inks, use of particles, for example pigments, in an ink jet ink is undesirable because such particles can settle out of the liquid vehicle over time, and can clog printhead nozzles (*see* page 2, lines 27-29, of Applicants specification). Particles do not allow reliable firing of an ink jet ink composition in a printhead. See, for example, the description of pigment particles in Applicants' specification at page 2, lines 24-29, and the Declaration of Dr. Chen, which demonstrates the poor firability of an ink jet ink containing dye-polymer resins wherein the resins are particles of hyperbranched polymers as suggested by the combination of Sacripante et al. with Figuly.

As discussed herein, neither Sacripante et al. nor Figuly, alone or in combination, disclose an ink jet ink composition comprising a hyperbranched polymer having a dye and a hydrophilic group incorporated into the base chain, wherein the composition does not include particles and has improved firability. This was discussed with Examiner Shosho in the June telephone conferences, and it was agreed that the combination of Sacripante et al. with Figuly does not disclose or suggest the claimed invention because Sacripante et al. requires the formation of particles, and Sacripante et al. only achieves water-solubility of those particles by attaching hydrophilic groups to the base chain of the dye-polymer resin. Therefore, as agreed by Examiner Shosho, the rejection of claims 1, 10, 12, 14, and 17-18 under 35 USC §103(a) over Sacripante et al. in view of Figuly should be reconsidered and withdrawn.

None of the disclosures of the Polymer Science Dictionary, Evans et al. '338, Chen et al., and Evans et al. '161, alone or in any combination, overcome the deficiencies of Sacripante et al., Figuly, or the combination thereof. In particular, none of the references teach a hyperbranched polymer incorporating a dye chromophore and a hydrophilic group in the polymer base chain. For at

least the above reasons, reconsideration and withdrawal of the rejections are respectfully requested.

Claim 11 has been objected to as being dependent upon a rejected base claim, but otherwise is indicated to include allowable subject matter. Applicants submit all of claims 1 and 10-18 are in condition for allowance for at least the reasons set forth herein. Prompt and favorable action is earnestly solicited.

Should the Examiner require anything further, or have any questions, she is invited to contact Applicants' undersigned representative.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'Kathleen Neuner Manne', is written over a horizontal line.

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